20th Congress, 1st Session. [Doc. No. 58.] Ho. of Reps. Dept. War.

CANAL—BALTIMORE TO CONTEMPLATED CHESAPEAKE & OHIO CANAL.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

Pursuant to a resolution of the House of Representatives of the 12th ultimo,

A REPORT AND PLANS

OF THE

SURVEY OF A ROUTE FOR A CANAL FROM THE CITY OF BALTIMORE

TO THE CONTEMPLATED

CHESAPEAKE AND OHIO CANAL.

JANUARY 14, 1828.

Referred to the Committee on Roads and Canals.

WASHINGTON:

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1828.

DEPARTMENT OF WAR,

January 11, 1828.

SIR: I have the honor to transmit, herewith, a report of the Chief Engineer of this date, accompanied by a report and plans of the survey of a route for a canal from the city of Baltimore to the contemplated Chesapeake and Ohio Canal, which were called for by a resolution of the House of Representatives, of the 12th ultimo.

As it has been found necessary to transmit the original drawings relative to this survey, I have to request that they may be returned to the Department whenever they may be found no longer useful to the House.

I have the honor to be,
Very respectfully,
Your obedient servant,
JAMES BARBOUR.

Hon. ANDREW STEVENSON,
Speaker of the House of Representatives.

ENGINEER DEPARTMENT,

Washington City, Jan. 11, 1828.

SIR: In pursuance of your orders, I have the honor to transmit, herewith, the report and plans of a survey of the route for a canal from the city of Baltimore to the contemplated Chesapeake and Ohio Canal, which were called for by a resolution of the House of Representatives, of the 12th ultimo.

As the accompanying drawings are original, I have to request that they may be returned to the Department, whenever they may be no longer serviceable to the House.

I have the honor to be,
Very respectfully,
Your obedient servant,
ALEX. MACOMB,
Maj. Gen. Chief Engineer.

Hon. JAMES BARBOUR,
Secretary of War.

***REPORT** on the survey of a Canal from the Potomac to Baltimore.*

To Major General MACOMB,
Chief Engineer.

On the subject of the survey directed in your instructions of August 15, 1826, of the country from the Potomac to Baltimore, with a view to connect the contemplated Chesapeake and Ohio Canal with the harbor of Baltimore, I have the honor to submit the following report, and also to present, as elucidating the same,

Four maps, Nos. 1, 2, 3, and 4, exhibiting the line of canal, and the topograghy of the country in its neighborhood, and also the experimental lines.

Two sheets—profiles Nos. 1 and 2, containing the profiles of the line of canal.

Two sheets—profiles Nos. 3 and 4, of the experimental lines.

One book, containing the results of the field notes, the guaging of streams, &c.

The previous orders of the Engineer Department, and the instructions of the Board of Internal Improvement, both dated June 16, 1826, having authorized and directed me to make such investigations as were necessary to obtain satisfactory data with relation to several subjects, but particularly to the supplies of water which might be afforded to the contemplated work, Mr. F. Harrison, Jr. was engaged

as assistant; who immediately entered on the duties assigned to him, and was assiduously employed therein during the two succeeding months. Among the objects to which his attention was directed, the most important was to guage, repeatedly, during the season, the streams to which it was foreseen resort would be necessary. From the series of his observations, which were afterwards continued at intervals by the surveying party, it is believed that we have sufficient information to render entirely satisfactory the conclusions we have drawn on this subject.

The latter part of August was occupied in making the necessary preparations. I commenced operations in the field the first day of September, assisted by Messrs. J. F. Swift and F. Harrison, Jr. as levellers, and Messrs. J. Miller and J. Wall, as surveyors. These operations, involving a large number of experimental lines which were necessary to ascertain with certainty, as directed by my instructions, the most eligible route for a canal from Baltimore to reach the Chesapeake and Ohio canal, at whatever point it might be found most advantageous, and necessarily consuming much time, were not completed until the last of October.

The object to which my attention was first directed, was to acquire such a knowledge of the high ground intervening between Baltimore and the valley either of the Potomac, or some of its tributaries, as to determine where it might be passed to most advantage. The obstacles of this high ground consisted, within the extent of country in which there was a probability of attaining our object, of three ridges, which were necessarily to be crossed; namely, 1. the ridge dividing the waters of the Patapsco from those of the Patuxent; 2. the ridge separating the two branches of the Patuxent; and, 3. the ridge dividing the waters of the Patuxent from those falling into the Potomac. It became clear that the proper course to pursue, was to establish the most favorable situation of the summit of the proposed canal; leaving its continuation in either direction to be governed by this location of the summit. With this view, these three ridges were therefore carefully examined with instruments, as far as appeared necessary to remove any doubts as to the points we had selected being the best for crossing them. The following detail of these examinations will shew the grounds on which our conclusions are founded.

The ridge between the Patapsco and the north branch of Patuxent, is crossed by the Baltimore and Washington turnpike, at Waterloo, twelve miles from the first named city. Our examination of this ridge was begun at a bench-mark left at a depression 1¼ miles south east of Waterloo, on the Annapolis road, by the Maryland Commissioners in 1823, and, as determined by them, 200.29 feet above mid-tide in Patapsco; a result which we found to agree with our observations. The point at which this bench-mark is made, was formerly selected as the most suitable point for passing the ridge, its depression being the greatest to be found, and a favorable valley making down from it towards the Patapsco, on the one hand, and another towards the north branch on the other. But to confirm the decision on this point, a lev-

elling and survey of the ridge was made for a considerable distance in either direction. To the northwest, it extended nearly three miles beyond Waterloo, where the further prosecution of this line was considered unnecessary, as the great height we had already attained evidently increased as we advanced, and our knowledge of the geography of the country plainly shewed, by the course of the streams, that the ridge must still continue to rise considerably for some distance beyond. To the southeast, the line was carried along the ridge until it reached a point opposite to which the waters on the left land, instead of flowing into the Patapsco, fell into the Severn. As it would necessarily add to the difficulties of the proposed work to be entangled in the valleys of this latter river, this circumstance was considered decisive on the subject to render any further examination of this line unnecessary. A reference to map No. 3, and profile No. 4, where this line is marked T U, and to the field-book, experimental line No. 10, will shew the details of its situation and elevation.

The dividing ridge between the waters of the Patuxent and those of the Potomac, required a more extensive examination. The survey made by the Maryland Commissioners, of which we had access to the field-books, was carried through the whole extent of Montgomery county, and showed clearly the inutility of making any further attempt in that quarter, above the granite ridge, running parallel to the sea-coast. We therefore confined our examinations of this first mentioned ridge to the southeast of the turnpike road, and extended our surveys four and a half miles, to a depression of the ridge, on the land of Zelic Duvall, and lying between the head waters of the Northeastern Branch and of Cash's Branch, a small stream falling into the Patuxent. This depression, and one close to the turnpike road, between the 20th and 21st mile-stones, offered, each, several advantages, which required some care to decide on the selection between them. The ridge at Duvall's may be passed at about fifteen or sixteen feet less elevation than at the other point; the ground is very favorable for cutting along the Northeastern Branch on the one side, and Cash's Branch on the other, and the general situation and direction of these valleys are favorable: but the following considerations induced the preference of the other route. Although the elevation of the summit to be cut through, is greater than at Duvall's, yet, from the very gradual declension of the ground on either side at the latter place, it is probable that the amount of excavation of the deep-cutting, would be nearly equal in both cases; while the route by Duvall's would involve the expense of a long feeder through unfavorable ground, and would also require extensive embankments across the broad valley of the Patuxent, more especially on the plan of having only one summit level for the canal; a plan which is so desirable, that it should not be abandoned but from the most serious considerations. The line marked N O, on map No. 2, and on profiles No. 3 and 4, and numbered 7 in the field-book, will shew the details of the survey of this ridge. It is necessary to observe that, for despatch, this line was carried along the most convenient ground, instead of keeping exactly on the crest of

the ridge, in situations where the obvious view of the topography of the country rendered such exactness unnecessary.

The ridge separating the branches of the Patuxent was found more formidable than had been anticipated; being found to differ but a few feet in general height from the two ridges before mentioned. The point we selected for passing it, is about a quarter of a mile to the southeast of the turnpike road, and was chosen for the following reasons: It lies nearly in a direct line between the two points fixed above, and is the lowest and most favorable depression that can be found within a considerable distance, offering greater facilities, and a less amount of excavation than any spot in the neighborhood. Another alternative offered of carrying the line of canal down towards the confluence of the two branches of Patuxent, until a favorable point offered for passing the intermediate ground. But while this plan would require a great deviation from the direct route, it would pass over ground rendered extremely unfavorable by the deep indentations of broad valleys, and composed of a soil unsuitable to retain water. So that this plan, while it would materially augment both the distance and the loss of water, would probably produce no economy of expense, and was therefore rejected. Reference to the map No. 3, and profile No. 4, where the line of survey of this ridge is marked R S, and to the field book, line No. 9, will show its details.

The investigations made of these ridges, may be considered as having satisfactorily shown, in the first place, that no line of canal communication from Baltimore to the Potomac can pass them to the northwest of the line selected. The general direction of this line is parallel to, and not far from, the foot of the granite ridge before mentioned, which traverses the Middle States, passing at the edge of Baltimore, and showing itself on the Potomac, at the Little Falls. The country to the west of this ridge, is, as it were, upheld by it, and is, therefore, considerably higher than that to the east of it; while the streams, in passing it, form falls of lesser or greater height, according as, from their size, they have been more or less able to break it down. It is this strongly marked geographical and geological formation, combined with the examinations I have made, that gives me confidence in pronouncing that all the communications which have been proposed through Montgomery county, such as those from different points of the Patapsco, or the Patuxent, to the head waters of the Seneca river, or the streams in its neighborhood, are entirely impracticable. On the other hand, the investigations I have made, authorize me in the belief that the line of canal selected, is more advantageous than any other that can be found to the south and east of it.

These points being determined, it became necessary, according to the instructions of the Board, to adopt such a level for the intermediate line of canal as would obviate, if possible, the necessity of alternate ascending and descending, and require only a single summit level. This, it was found, could be effected by passing the three ridges abovementioned at a considerable depth below their summits, either by tunnels or deep-cutting. Notwithstanding the formidable expense

of these works, this plan was adopted without hesitation, on account of the great advantages it offered. After several trials of the ground, by running lines at different levels, and much consideration, the elevation of 146 feet above mid-tide was adopted for the surface of the canal. This elevation is a few feet lower than would have been desirable, on account of the deep-cuttings and other circumstances of the ground, but was chosen in order to avoid injury to the extensive Savage Cotton Factory, situated on the north branch of Patuxent, the water of which branch will be required for the proposed work. As any injury to this factory would involve a great expense for damages, it was considered more advantageous to avoid it, by assuming a lower level than would otherwise have been expedient; which, although increasing the cost of the work, will, at the same time, render the plan of the canal itself more perfect, by diminishing the amount of lockage and the loss of water by filtration, to which the more extensive embankments necessary at a higher level, would be subject. This level will give to the canal a summit level of considerable extent, but will necessitate, on the supposition of passing the ridges without tunnelling, three extensive deep cuttings: 1st, of the Waterloo ridge, of the greatest depth, of 64 feet, and extending for the distance of $2\frac{1}{8}$ miles; 2d, of the middle ridge, between the two branches of Patuxent, of 74 feet greatest depth, and more than $1\frac{1}{8}$ miles in extent: and, 3d, of Snowden's ridge, near Vansville, of 72 feet greatest depth, and extending $2\frac{1}{2}$ miles. The expense of these cuttings will be truly formidable, as will be seen by a reference to the estimate, where the aggregate of the three amounts to more than one million two hundred thousand dollars. It was concluded, however, to assume this plan in making all the calculations; leaving it to future consideration to determine whether the greater economy of passing these difficulties, in part, by tunnels, would compensate for the inconveniences and embarrassments to an active trade which would result from their adoption.

This much being satisfactorily established, we proceeded to locate the summit level of the canal, which we found could be extended, with advantage, to $12\frac{1}{8}$ miles. A reference to the map will shew that it will be much less winding and circuitous, than, from the nature of the country over which it will pass, might have been anticipated. But little embankment will be required, and the ground, in general, except the obstacles of the deep-cuttings, is favorable.

The location of the summit thus established, we proceeded to the examination of the continuation of the canal towards the Potomac. The most natural course for this to pursue, was along the valley of the the northeastern branch, leading to Bladensburg. A line along this valley was accordingly surveyed, and found to be very favorable; at Bladensburg the line was crossed to the right bank of the Eastern Branch, and was continued on this bank to near the upper city bridge, whence it left the shore of the branch, and was carried through the city of Washington, to the north of the Capitol, the City Hall, and the President's House, to Rock Creek, over which an aqueduct is

proposed to communicate with the termination of the Chesapeake and Ohio Canal in Georgetown. From Bladensburg, several attempts were made to take advantage of several valleys, that appeared promising for the purpose, and to find through them a more direct and favorable line towards the Potomac, than that along the shore of the Eastern Branch. These attempts were, however, unsuccessful. Reference to the map No. 1, and profile No. —, where these lines are marked G H, I K, L M, and the field notes, Nos. 4, 5, and 6, will shew their situation and elevation. Through the city of Washington, the line was continued in a direction where a considerable amount of cutting must be encountered: this course was preferred, on account of its not interfering with any buildings, or other improvements of consequence; whereas a line that could be more easily executed, and that would be of more advantage to the city of Washington, might, without doubt, be found to the south of the President's House, and would amply compensate to the city, by its benefits, for the destruction of buildings which it would occasion. But as it could not be conveniently ascertained with correctness at the present time, how far this would be the case, it was deemed proper, in the first instance, to carry the line in such a direction as to avoid this interference with improved property as much as possible.

The execution of the canal, according to the plan thus proposed, depends essentially upon the supposition of the Chesapeake and Ohio Canal being continued from the Little Falls of Potomac to Georgetown, at an elevation of at least 25 or 30 feet above tide; and affording to this lateral canal, a supply of water sufficient for its consumption, at least as far as the Eastern Branch—a distance of about 5 miles. If, on the contrary, the principal canal terminated just below the Little Falls, or at some other point above Georgetown, the direct connexion of the Maryland canal with it becomes impracticable; and this latter work will, in consequence, be rendered imperfect, and deprived of half its utility. For it is believed that it may be confidently asserted, that, if the Maryland canal be forced to descend into tide at the Eastern Branch, and to have its connexion with the Chesapeake and Ohio Canal only through the tide of this Branch and the Potomac river, that it cannot attain its object of enabling the city of Baltimore to enter into a fair competition with the cities of the District, for the trade of the West.

The practicability of the line above described being established, the next object to which my attention was directed by my instructions, was to ascertain whether a more direct communication to the Potomac could not be found, to intersect the Chesapeake and Ohio Canal somewhere between Georgetown and the Great Falls. On a careful view of the ground, it was apparent that the principal obstacle to such a communication, was offered by the ridge separating the Potomac from Rock Creek. This ridge was therefore surveyed for about 5 miles above Georgetown, and was carefully examined as far as Montgomery Court-House. The result shewed it to be so unfavorable to our purpose, as to produce a decided conviction that

any canal from the Potomac, in the direction of Baltimore, and passing to the north of Georgetown, is absolutely impracticable. This ridge thus offering an insurmountable obstacle, rendered any further investigations on this subject unnecessary. A reference to the map No. 1, and profile No. 3, where this line is marked C D, and to the field book No. 2, will shew the particulars of this survey.

Having thus completed the surveys from the summit to the Potomac, we returned to the northern termination of the summit level, and proceeded with the survey of the line of canal towards Baltimore. This was continued along the valleys of Licking run and Deep run, to Elkridge Landing, where it crossed the Patapsco, and continues, along its left bank, to the Ferry Branch, in which our survey terminated at Carroll's Point. This was considered as a favorable place for the termination of the canal, as it is far within the limits of the city, close to its populous part, and upon a secure harbor, between which and the principal harbor or basin, a direct communication through the city may easily be made, whenever it may be deemed necessary.

Having thus given the details of the operation performed to determine the best line for the proposed canal, I now proceed to give a more particular description of the route selected. To do this clearly, it will be necessary to enter into some repetitions, which will be excused for the sake of perspicuity.

Supposing the Chesapeake and Ohio Canal to terminate, as proposed, in a basin in Georgetown, between Bridge and Water streets, the Maryland Canal will commence at this basin, and will continue, at the same level, to pass Rock creek, by an aqueduct, a little above the present upper bridge, and continue, nearly east, across the city o Washington, to the toll-gate at the boundary of the city, on the Maryland Avenue. From this point, the line follows the direction of a valley to the bank of the Eastern Branch, where it is proposed to descend by two locks, so as to place the surface of the water of the canal at the height of about 16 feet above tide. This is done to lessen the expense of the embankments which are necessary at several places along the shore of the Eastern Branch, and at the crossing at Bladensburg ; but it will become a matter of future examination, whether a higher level than this cannot be assumed for this portion, with advantage. The line then continues along the bank of the Eastern Branch, and crosses it by an aqueduct immediately below the bridge at Bladensburg. Passing through this town, it follows, first, the valley of the Northeastern Branch, and then that of Piney Branch, crossing the turnpike road ¼ mile south of Vansville. A little beyond this, the line attains its highest elevation, and the summit level commences ; and a little further the deep-cutting through the Snowden Ridge begins. The turnpike road will again cross the canal at nearly the deepest part of this cutting. From the northern end of this deep cut, the line passes over the main Patuxent, which it crosses by an aqueduct about 150 yards below the turnpike bridge, and continues nearly parallel to the turnpike road until it has passed the deep cut of the middle ridge. Here it deviates considerably from a direct course, passing the north branch

of Patuxent near the old Baltimore and Washington road, and then running nearly east, until it reaches the valley of Chandler's Branch, which valley it pursues to the commencement of the deep cut of the Waterloo ridge. This last cut extends to the valley of Licking Run, and not far from its end is the termination of the summit level. The line then follows this valley, and that of Deep Run, to Elkridge Landing, where it crosses the Patapsco by an aqueduct about ¼ mile below Smith's bridge. It then continues along the left shore of the Patapsco to about a mile below Sweetzer's bridge, where it crosses over the neck of land intervening between the Patapsco and the Ferry Branch, and which forms the isthmus of Moale's Point. It has been thought preferable to encounter the deep-cutting which this course will require, near Kreb's House, to continuing along the shore round the point, on account of the distance saved, and the extremely unfavorable nature of the shore to the north and west of the point. Arrived at the Ferry Branch, it continues along its west shore, and passes the outlet of Gwynn's Falls by an aqueduct and embankment, about 100 yards from the present bridge, and communicates, by two locks, with the tide at Carroll's Point. Here we supposed the canal to terminate; but if a continuation of it be deemed necessary, it may be made, without much difficulty, to enter the basin near its southwest corner, and near the intersection of Light street wharf with Hughes' quay.

The following summary presents, at one view, several of the particulars of this route:

SUMMARY.

	Distance. Miles.	No. of Locks.	Ascent, feet.	Descent, feet.
Georgetown to Bladensburg - - -	9⅛	2	-	18
Bladensburg to summit level - - -	9½	17	130	
Summit level - - - - -	12⅞			
Summit level to Elkridge Landing - -	5⅜	16	-	122
Elkridge Landing to Baltimore - -	7⅛	3	-	24
Total - - - -	44¾	38	130	164

On the supply of water.

The summit of the canal will be supplied with water, in addition to several small streams, by the two branches of the Patuxent, which can be conducted into it by feeders of ¾ and 1¾ miles respectively. In descending towards the Potomac, the water of the Northeastern Branch will furnish an additional quantity; and, near Bladensburg, the northeastern and northwestern branches will be both at command. It is proposed to supply the section from Georgetown to the Eastern Branch, a distance of about five miles, with water drawn from the Potomac, above the Little Falls, through the Chesapeake and Ohio canal.

In descending from the summit towards Baltimore, there is no stream of consequence at command until we arrive at Elkridge Landing, where a supply from the Patapsco will furnish, abundantly, the

distance to Baltimore. It is hoped that this may be done without injury to the extensive Avalon Iron Works situated on this river.

The last season afforded a most favorable opportunity of ascertaining the minima quantities of water afforded by the streams above-mentioned. By the end of June, a long continuance of dry weather, aided by the great draught of the previous year, had reduced all the streams of this section of country very low. The rain which fell the first days of July had a very temporary effect upon them; but they again subsided so fast, that, by the beginning of August, they were so much reduced, that several cotton mills in the State, whose supply of water has hitherto been deemed most ample at all seasons, were compelled to intermit their work; and many of the inhabitants, led by occupation to remark such particulars, observed that the waters were then lower than at any previous time within their recollection. The rain in the first week of August, although amounting to 1.40 inch, was also productive of only very temporary effects; and, by the beginning of September, the streams were as low or lower than before. The following table presents the results of the principal guagings of them made during the Summer; those being rejected in which there was reason to believe that, from accidental circumstances, confidence could not be placed:

NAME OF STREAMS.	DATE.	WHERE GUAGED.	METHOD USED.	Discharge cubic feet per second.
Patuxent - -	July 7	Near Edmonston's Mill, 3 miles above turnpike road	Section -	55.6
do - -	12	½ mile above Snowden's Mill	do	72.5
do - -	26	Near Edmonston's Mill -	do	36.7
do - -	31	Below turnpike road -	do	34.4
do - -	Aug. 2	Near Edmonston's Mill -	do	26.5
do - -	7	do do - -	do	53.7
do - -	15	do do - -	do	72.3
do - -	20	do do - -	do	32.6
do - -	24	do do - -	do	29.7
do - -	Sept. 7	Below turnpike road -	do	28.8
North Branch Patuxent	May 22	Savage Factory - -	do	25.2
do - -	29	do do - -	do	35.3
do - -	June 11	do do - -	do	23.8
do - -	July 2	do do - -	do	49.9
do - -	9	do do - -	do	37.5
do - -	29	Below turnpike road -	do	17.5
do - -	Aug. 3	do do - -	do	14.4
do - -	8	do do - -	do	21.7
do - -	15	do do - -	do	30.4
do - -	18	do do - -	do	16.
do - -	22	do do - -	do	17.5
do - -	Sep. 7	Savage Factory - -	Estimated	12.
Hammond's Branch -	8	At turnpike road - -	Dam -	0.26
Saw Mill Branch -	11	do do - -	do	0.34
Chandler's Run -	8	Near end of deep-cut -	do	0.68
Piney Branch -	July 19	Near Herbert's Mill -	Section -	0.41
Northeastern Branch -	Sep. 20	On Prater's Farm - -	Dam -	3.27
do - -	July 18	Near Bladensburg - -	Section -	19.5
Northwestern Branch	18	do do - -	do	23.8
Deep Run - -	13	1½ miles from mouth -	do	2.5
do - -	24	Below paper mill - -	do	1.6

The estimate made, September 7, of the quantity of water afforded by the North Branch of Patuxent, was founded on the quantity consumed by the Savage Factory when in operation, which was measured. It was found that the whole supply of the stream for 24 hours, was just adequate to keep the machinery in action for 12 hours; the dam being capacious enough to accumulate during the night a quantity sufficient to remove the deficiency during the day. The irregularity of the stream at this time, from the water being held up occasionally by the numerous mills above, rendered a resort to this mode of estimating necessary.

In examining into the sufficiency of this supply of water, we will first consider the summit level. This, as before stated, will be 12⅞ miles in extent; but, as from its two ends, there will be some distance of canal before receiving any further supply of water, it will be necessary to consider these intervals in connexion with the summit. They will be, respectively, 3¼ miles towards the Potomac, and 3⅞ miles towards Baltimore; adding the two feeders of 1¾ and ¾ miles, will give a total distance of 22½ miles to be supplied by the following streams, which may be relied on to afford, at the dryest times, the quantities of water below:

Main Patuxent,	26.5	cubic feet per second.
North Branch Patuxent,	12.	
Hammond's Branch,	0.26	
Saw Mill Branch,	0.34	
Piney Branch,	0.41	
Chandler's Branch,	0.68	
Total,	40.19	cubic feet per second.

If we allow for the consumption of the canal, for lockage, evaporation, and filtration, 1½ cubic feet per second per mile, which appears a far more ample allowance than will be needed for a canal placed in the favorable circumstances for retaining water of the pres en one, we have 33.75 cubic feet required for the supply of 22½ miles; leaving a surplus of 6.44 cubic feet per second. If we reflect that these measurements were taken during a season of almost unparalleled drought, and that the allowance for the wants of the canal is a maximum, it will become a matter of consideration, in constructing the work, to ascertain if the water of the North Branch cannot be dispensed with, and thereby avoid the necessity of interfering with the valuable grist and saw mills which occupy the second fall at the Savage Factory; or, otherwise, to make conditional arrangements to require this supply only during a time of scarcity; leaving these mills at other times unimpeded.

It is to be remarked, that, should it be wished, at any future period, to increase the supply of water during the dry season by means of reservoirs, there are numerous situations in the different valleys for doing this with facility and to a great extent. The valley of Hammond's Branch may be mentioned as affording several favorable sites for similar works.

In descending towards the Potomac, the canal will receive additional supplies from the Northeastern Branch until it reaches the neighborhood of Bladensburg, where, as already remarked, it can command the waters of the Northeastern and Northwestern Branches united, which will be more than sufficient for its supply to the point to which it will be furnished by the Potomac.

In proceeding towards Baltimore, from the point above fixed, the canal will be further supplied for one and a half miles by Deep run, affording July 13, 2.5 cubic feet per second. From Elkridge Landing to Baltimore, 7¼ miles, it will depend on the Patapsco. It was not thought necessary to make any careful measurements of this river, as its supply was considered as much more than sufficient for this short distance.

From these premises, therefore, we draw the conclusion, that this canal can be amply supplied with water, throughout its whole extent, and at all seasons.

In obedience to the instructions of the Board of Internal Improvement, to pay a due attention, in case of the line of the canal approaching the city of Washington, to the practicability of connecting it by an embranchment with the United States' Navy Yard, I made a survey with a view to ascertain the practicability of forming this connexion parallel to, and along the shore of, the Eastern Branch, quitting the main canal near the present toll-gate on the Maryland Avenue. The ground which would have to be passed over, on such a plan, offers so many difficulties, as to leave little doubt but that the most expedient connexion with the Navy Yard would be, by passing to the west of the Capitol, at the proper elevation, on the declivity of the hill, and thence, nearly in a direct line, to the desired point. A survey of this route was not made, as the situation of the ground left no doubt of the practicability of effecting it. The importance which it would afford for the construction of dry docks, in addition to its other advantages, would render this appendage of the greatest utility to this establishment.

My attention was also directed, by the instructions of the Board, to the facilities afforded by the ground and the line of canal, to erect, in time of emergency, a temporary line of defensive works. A reference to the map No. 1, will shew that the line passes considerably within the limits of the city : it however includes between it and the Potomac, all the thickly built part, and it will probably be some time before the ground to the north of this line will be densely inhabited. For the greater part of the distance between the Eastern Branch and Rock creek, the line passes where deep-cutting will be necessary, and will thus afford an opportunity of easily forming, merely by a proper disposition of the earth which must be excavated, a formidable barrier of defence. Towards the Eastern Branch, some additional military works will be necessary to give this portion of the line the same strength that the remainder will necessarily possess from its peculiar situation. These works combined, insulating the city of Washington, would form for it a strong defensive barrier, more effectual,

perhaps, than could be obtained by pretty extensive works executed for this only object.

I now proceed to offer the estimate of the probable cost of this work, which has been made in conformity with the estimate of the Chesapeake and Ohio canal, the prices being altered as required by local circumstances. In conformity to the plan of that canal, the present one is intended to be forty-eight feet wide at the surface of the water, (exclusive of the surf-berm on each side on a level with the surface,) thirty-three feet at bottom, and five deep. The locks to be 104 feet from heel-post to heel-post, and 14 feet wide in the clear, the walls of which to be constructed of faced stone, carefully bonded, and laid in water cement.

ESTIMATE of the probable cost of a Canal from the Potomac, at Rock Creek, to Baltimore.

No.	Distance.	Distance from beginning.	Distance to station.				Amount.	
	Yards.	M. Yds.						
1	983	983	4	Aqueduct across Rock Creek, 50 feet span		-	$29,715 00	
				Excavation 131,722 cubic yards, at 27 cents		-	35,564 94	
				Do 52,099 do	at 17 cents	-	6,772 87	
				Embankment 5,200 do	at 20 cents	-	1,040 00	
								$ 73,092 00
2	140	1123	5	Excavation 8,680 do	at 16 cents	-	- -	1,388 80
3	550	1673	8	Do 55,550 do	at 16 cents	-	- -	8,888 00
4	370	1 283	10	Do 52,540 do	at 18 cents	-	- -	9,457 20
5	350	1 633	12	Do 92,000 do	at 22 cents	-	- -	20,328 00
6	464	1 1097	15	Do 111,360 do	at 22 cents	-	- -	24,499 20
7	1024	2 361	22	Do 208,896 do	at 22 cents	-	- -	45,957 12
8	1007	2 1368	28	Do 151,050 do	at 20 cents	-	- -	30,210 00
9	286	2 1654	31	Do 6,292 do	at 13 cents	-	817 96	
				Aqueduct Tiber creek - - -		-	1,460 00	
				Embankment 3,140 cubic yards, at 20 cents		-	628 00	
								2,905 96
10	554	3 448	36	Excavation 77,560 do	at 18 cents	-	- -	13,960 80
11	840	3 1288	40	Do 18,900 do	at 13 cents	-	2,457 00	
				Two culverts, at 400 - - -		-	800 00	
								3,257 00

ESTIMATE—Continued.

No.	Distance.	Distance from beginning.	Distance to station.			Amount.
	Yards.	M. Yds.				Dollars.
				Bridges at passage of avenues, No. 8, at $2,000	- -	16,000 00
12	1440	4 968	46	Excavation 145,440 cubic yards, at 18 cents -	$26,179 20	
				Bridge at turnpike - - - -	3,000 00	
						29,179 20
13	1000	5 208	51	Excavation 45,000 cubic yards, at 17 cents -	7,820 00	
				2 locks, Nos. 1 and 2, 16 feet - - -	26,400 00	
						34,220 00
14	1664	6 112	62	Excavation 36,508 cubic yards, at 13 cents -	4,746 04	
				Embankment 23,296 cubic yards, at 22 cents -	5,125 12	
				2 culverts, at $300 - - - -	600 00	
				1 large do - - - - -	800 00	
						11,271 26
15	490	6 602	65	Excavation 11,270 cubic yards, at 17 cents -	- -	1,915 90
16	202	6 804	67	Do 19,392 do at 20 cents -	3,878 40	
				Puddling, 3,434 yards, at 12 cents - -	412 08	
						4,290 48
17	840	6 1644	76	Walling, 10,080 cubic yards, at $4 50 - -	45,360 00	
				Embankment, 26,040 cubic yards, at 22 cents -	5,728 80	
				Puddling, 14,280 cubic yards, at 12 cents -	1,713 60	
				1 culvert - - - - -	560 00	
						53,362 40

18	238	7	122	79	Excavation, 22,848 cubic yards, at 20 cents -	4,569 60	
					Embankment, 3,840 cubic yards, at 22 cents -	844 80	
					1 culvert - - - - -	300 00	
							5,714 40
19	360	7	482	82	Excavation, 19,440 cubic yards, at 17 cents -	- -	3,304 80
20	134	7	616	85	Do 4,556 do at 17 cents -	- -	664 52
21	182	7	798	88	Do 1,320 do at 14 cents -	184 80	
					Embankment, 3,660 cubic yards, at 20 cents -	732 00	
					1 culvert - - - - -	300 00	
							1,216 80
22	322	7	1120	93	Excavation, 10,948 cubic yards, at 17 cents -	- -	1,861 16
23	124	7	1244	95	Do 6,696 do at 17 cents -	- -	1,138 32
24	188	7	1432	97	Do 1,430 do at 17 cents -	243 10	
					Embankment, 3,936 do at 20 cents -	787 20	
					Culvert - - - - - -	300 00	
							1,330 30
25	760	8	432	108	Excavation, 41,040 cubic yards, at 18 cents -	- -	7,387 20
26	580	8	1012	114	Do 1,100 do at 18 cents -	198 00	
					Embankment, 18,560 do at 22 cents -	4,083 20	
					Aqueduct - - - - -	1,620 00	
							5,901 20
27	440	8	1452	118	Excavation, 23,760 cubic yards, at 14 cents -	- -	3,326 40
28	222	8	1674	120	Do 7,548 do at 14 cents -	1,056 72	
					Farm bridge - - - - -	300 00	
							1,356 72
29	446	9	360	124	Embankment, 33,280 cubic yards, at 22 cents -	7,321 60	
					Excavation feeder, 28,600 cubic yards, at 17 cents	4,862 00	
					Dam - - - - - -	1,200 00	
					Aqueduct, Eastern Branch - - -	45,380 00	

ESTIMATE—Continued.

No.	Distance.	Distance from beginning.	Distance to station.			Amount.
	Yards.	M. Yds.				Dollars.
				Excavation, 2,200 cubic yards, at 17 cents -	374 00	
				2 bridges, Bladensburg - - - -	2,200 00	
				Waste gate and weir - - - -	800 00	
						61,137 60
30	840	9 1200	131	Excavation, 18,480 cubic yards, at 16 cents -	2,956 80	
				Feeder from Eastern Branch and dam -	3,200 00	
						6,156 80
31	1200	10 640	138	Excavation, 31,200 cubic yards, at 17 cents -	5,304 00	
				Embankment, 81,600 do at 22 cents -	17,952 00	
				Lock No. 3, 8 feet - - - -	13,200 00	
				Aqueduct over northeastern branch - -	22,000 00	
				Culvert - - - - -	300 00	
				Bridge - - - - - -	300 00	
						59,056 00
32	690	10 1330	142	Excavation, 15,180 cubic yards, at 17 cents -	2,580 60	
				Lock No. 4, 8 feet - - - -	13,200 00	
						15,780 60
33	558	11 128	146	Excavation, 18,972 cubic yards, at 17 cents -	3,225 24	
				Embankment, 3,348 cubic yards, at 22 cents -	736 56	
				Lock No. 5, 8 feet - - - -	13,200 00	
				Culvert $350; bridge 300 - - -	650 00	17,811 80

34	2192	12	560	158	Excavation, 49,320 cubic yards, at 18 cents -	8,877 60	
					Lock No. 6, 8 feet - - - -	13,200 00	
					2 farm bridges - - - - -	600 00	
							22,697 60
35	1120	12	1630	164	Embankment, 116,480 cubic yards, at 22 cents -	25,625 60	
					Excavation, 9,240 cubic yards, at 17 cents -	1,570 80	
					Lock No. 7, 8 feet - - - -	13,200 00	
					Aqueduct, Paint branch - - -	18,500 00	
							58,896 40
36	1098	13	1018	170	Excavation, 24,156 cubic yards, at 16 cents -	3,864 96	
					Lock No. 8, 8 feet - - - -	13,200 00	
							17,064 96
37	920	14	178	177	Excavation, 31,280 cubic yards, at 17 cents -	5,317 60	
					Culvert - - - - - -	300 00	
					Farm bridge - - - - -	300 00	
							5,917 60
38	945	14	1123	181	Excavation, 6,380 cubic yards, at 17 cents -	1,084 60	
					Embankment, 20,800 cubic yards, at 22 cents -	4,576 00	
					Lock No. 9, 8 feet - - - -	13,200 00	
							18,860 60
39	724	15	87	185	Excavation, 24,616 cubic yards, at 14 cents -	3,446 24	
					Locks 10 and 11, 16 feet - - -	26,400 00	
					Culvert - - - - - -	300 00	
							30,146 24
40	1362	15	1449	191	Excavation, 29,954 cubic yards, at 14 cents -	4,194 96	
					Lock No. 12, 8 feet - - - -	13,200 00	
					Bridge - - - - - -	300 00	
					Culvert - - - - - -	300 00	
							17,994 96

ESTIMATE—Continued.

No.	Distance.	Distance from beginning.	Distance to station.			Amount.
	Yards.	M. Yds.				Dollars.
41	1218	16 907	198	Excavation, 31,668 cubic yards, at 16 cents -	5,066 88	
				Locks, Nos. 13, 14, and 15, 22 feet - -	36,300 00	
				Bridge, turnpike road - - - -	1,200 00	
				Large culverts - - - - -	850 00	
						43,416 88
42	1004	17 151	202	Excavation, 10,846 cubic yards, at 17 cents -	1,843 82	
				Embankment, 51,611 cubic yards, at 22 cents -	11,354 42	
				2 culverts - - - - -	600 00	
				1 large culvert - - - - -	850 00	
						14,648 24
43	870	17 1021	210	Excavation, 27,840 cubic yards, at 17 cents -	4,732 80	
				Embankment, 4,080 do at 22 cents -	897 60	
				Two culverts - - - - -	600 00	
				Bridge - - - - - -	300 00	
				Locks Nos. 16 and 17, 14 feet - - -	23,100 00	
						29,630 40
44	1168	18 429	218	Excavation, 25,696 cubic yards, at 17 cents -	4,368 32	
				Two culverts - - - - -	600 00	
				One bridge - - - - -	300 00	
				Lock 18, 7 feet - - - - -	11,550 00	
						16,818 32

45	630	18	1059	221	Excavation, 13,860 cubic yards, at 17 cents -	2,356 20	
					Lock No. 19, 7 feet - - - -	11,550 00	
							13,906 20
46	4347	21	126	254	Deep cutting, Snowden's Ridge—		
					Excavation 1,906,210 cubic yards, at 25 cents -	476,552 50	
					Do back drains, &c. 78,246 cubic yds. at 17 cts.	13,301 82	
					Bridge at turnpike - - - -	20,000 00	
					Bridge - - - - - -	300 00	
							510,154 32
47	1870	22	236	266	Excavation, 41,040 cubic yards, at 17 cents -	6,993 80	
					Two culverts - - - - -	600 00	
					One bridge - - - - -	500 00	
							8,093 80
48	376	22	612	268	Embankment, 20,304 cubic yards, at 22 cents -	4,466 88	
					Puddling, 6,392 yards at 12 cents - -	767 04	
					One culvert - - - - -	1,200 00	
							6,433 93
49	1134	22	1746	274	Excavation, 24,948 cubic yards, at 18 cents -	4,490 64	
					Two culverts - - - - -	600 00	
							5,090 64
50	495	23	481	278	Embankment, 26,730 cubic yards, at 22 cents -	5,880 60	
					Puddling, 6,800 do at 12 cents -	816 00	
					Aqueduct over Patuxent—		
					3 arches, 30 feet span - - - -	34,120 00	
					Waste weir and gate - - - -	600 00	
							41,416 60
51	784	23	1265	285	Excavation, 17,248 cubic yards, at 14 cents -	2,414 72	
					One bridge - - - - -	500 00	
					One culvert - - - - -	300 00	3,214 72

ESTIMATES—Continued.

No.	Distance.	Distance from beginning.	Distance to station.			Amount.
	Yards.	M. Yds.				Dollars.
52	2510	25 255	318	Deep cutting, middle ridge—		
				Excavation, 1,141,344 cubic yards, at 25 cents -	285,336 00	
				Do back drains, &c. 44,784 c. y. at 17 cts.	7,613 28	
				Road bridge - - - - -	6,000 00	
						298,949 28
53	524	25 779	326	Excavation, 11,528 cubic yards, at 17 cents -	1,959 76	
				Dam and feeder from Hammond's branch -	2,000 00	
						3,959 76
54	920	25 1699	335	Embankment, 95,680 cubic yards, at 24 cents -	22,963 20	
				Puddling, 15,640 yards, at 12 cents - -	1,876 80	
				Aqueduct North Branch Patuxent—		
				Three arches 30 feet span - - -	32,460 00	
				Waste weir and gate - - - -	600 00	
						57,900 00
55	730	26 779	342	Excavation, 16,060 cubic yards, at 17 cents -	2,730 20	
				Embankment, 4,200 cubic yards, at 22 cents -	924 00	
				Three culverts - - - - -	900 00	
						3,554 20
56	414	26 1073	345	Embankment, 11,040 cubic yards, at 22 cents -	2,428 80	
				Puddling 5,865, at 12 - - - -	703 80	

					One culvert - - - - -	600 00	
					One farm bridge - - - - -	300 00	
							4,032 60
57	1414	27	727	355	Excavation, 31,108 cubic yards at 18 cts. -	5,599 44	
					Embankment, 1,600 cubic yards, at 22 cts. -	352 00	
					Culvert - - - - -	450 00	
							6,401 44
58	1205	28	172	366	Excavation, 28,920 cubic yards, at 20 cts, -	5,784 00	
					One road bridge - - - - -	500 00	
					One farm bridge - - - - -	300 00	
					One culvert - - - - -	300 00	
							6,884 00
59	1740	29	152	380	Excavation, 41,760 cubic yards, at 20 cts. -	8,352 00	
					Two culverts - - - - -	600 00	
							8,952 00
60	3874	31	506	419	Deep cutting Waterloo Ridge—		
					Excavation, 1,557.126 cubic yards, at 25 cts. -	389 281 50	
					Do back drains, &c. 69,782 c. y. at 17 cts.	11,854 24	
					Bridge road - - - - -	6,000 00	
							407,035 74
61	1730	32	476	433	Excavation, 38,060 cubic yards, at 17 cts. -	6,470 20	
					Embankment, 2,400 do at 22 cts. -	528 00	
					One culvert - - - - -	400 00	
					Locks Nos. 20, 21, 22, 21 feet - - -	34,650 00	
							42,048 20
62	820	32	1296	435	Excavation, 19,680 cubic yards, at 17 cts. -	1,377 60	
					Locks Nos. 23, 24, 14 feet - - -	28,100 00	
					Bridge - - - - - -	800 00	
					Culvert - - - - - -	300 00	25,077 60

ESTIMATE—Continued.

No.	Distance.	Distance from beginning.	Distance to station.			Amount.
	Yards.	M. Yds.				Dollars.
63	848	33 384	441	Excavation, 27,136 cubic yards, at 18 cts. -	4,884 48	
				Culvert - - - - -	420 00	
				Locks Nos. 25, 26, 27, and 28, 31 feet - -	51,150 00	
				Two culverts - - - - -	600 00	
						57,054 48
64	940	33 1324	447	Excavation, 30,960 cubic yards, at 18 cts. -	5,652 80	
				Lock 29, 8 feet - - - - -	13,200 00	
				Culvert - - - - -	300 00	
				Bridge - - - - - -	500 00	
						19,652 80
65	1228	34 792	458	Excavation, 39,296 cubic yards, at 17 cts. -	6,680 32	
				Locks Nos. 30, 31, and 32, 24 feet - -	39,600 00	
				Two culverts - - - - -	600 00	
				Bridge - - - - - -	300 00	
						47,180 32
66	1182	35 214	466	Excavation, 20,368 cubic yards, at 17 cents -	4,822 56	
				Lock No. 33, 8 feet - - - -	13,200 00	
				Two culverts - - - - -	600 00	
				Bridge - - - - - -	300 00	
						18,922 56
67	1756	36 210	475	Excavation, 38,632 cubic yards, at 18 cents -	6,953 76	

					Locks 34 and 35, 16 feet - - -	26,400 00		
					Two culverts - - - - -	600 00		
					Two bridges - - - - -	800 00		
							34,753 76	
68	776	36	986	480	Excavation, 26,384 cubic yards, at 18 cents -	4,749 12		
					Bridge - - - - - -	500 00		
					Two culverts - - - - -	600 00		
							5,849 12	
69	432	36	1398	484	Embankment, 14,620 cubic yards, at 22 cents -	3,216 40		
					Aqueduct over Patapsco, 5 arches - -	59,307 00		
					Lock 36, 8 feet - - - - -	13,200 00		
					Feeder from Patapsco - - - -	3,484 80		
					Dam - - - - - -	3,000 00		
					Waste-gate and weir - - - -	600 00		
							82,808 20	
70	1010	37	648	489	Excavation, 22,220 cubic yards, at 17 cents -	3,777 40		
					Bridge - - - - - -	300 00		
					Culvert - - - - - -	300 00		
							4,377 40	
71	452	37	1100	493	Excavation, 24,408 cubic yards, at 18 cents -	- -	4,393 44	
72	1192	38	532	499	Excavation, 26,224 cubic yards, at 17 cents -	4,458 08		
					One culvert, 300 ; one bridge, 300 - -	600 00		
							5,058 08	
73	760	38	1292	502	Excavation, 25,840 cubic yards, at 18 cents -	- -	4,651 20	
74	160	38	1452	504	Embankment, 8,640 cubic yards, at 20 cents -	1,728 00		
					Culvert - - - - - -	800 00		
							2,528 00	
75	648	39	360	508	Excavation, 20,736 cubic yards, at 18 cents -	3,732 48		
					Bridge - - - - - -	300 00	4,032 48	

ESTIMATE—Continued.

No.	Distance.	Distance from beginning.	Distance to station.			Amount.
	Yards.	M. Yds.				Dollars.
76	260	39 620	511	Embankment, 14,040 cubic yards, at 28 cents -	2,808 00	
				Culvert - - - - - -	800 00	
				Road bridges - - - - -	600 00	
						4,208 00
77	1370	40 230	521	Excavation, 30,140, cubic yards, at 17 cents -	5,123 80	
				Culvert - - - - - -	300 00	
						5,423 80
78	1466	40 1696	533	Excavation, 152,464 cubic yards, at 20 cents -	30,492 80	
				Road bridge - - - - -	1,200 00	
						31,692 80
79	2324	42 500	547	Excavation, 74,368 cubic yards, at 19 cents -	13,386 24	
				Three culverts - - - - -	900 00	
						14,286 24
80	390	42 890	549	Excavation, 8,580 cubic yards at 18 cents -	- -	1,544 40
81	862	42 1752	556	Excavation, 206,514 cubic yards, at 22 cents -	45,433 08	
				Do. back drains, &c. 15,716, at 17 cents -	2,671 72	
						48,104 80
82	620	43 612	563	Excavation, 132,220 cubic yards, at 22 cents -	29,088 40	
				Do. back drains, &c. 11,484 cubic yards, at 17	1,952 28	

83	300	43	912	565	Excavation, 5,097 cubic yards, at 17 cents -	1,036 49	
					Embankment, 637 cubic yards, at 18 cents -	114 66	
					Road bridge - - - - -	500 00	
					One culvert - - - - -	300 00	
							1,951 15
84	568	43	1480	567	Excavation, 19,728 cubic yards, at 17 cents -	3,363 76	
					Large culvert - - - - -	520 00	
					Three culverts - - - - -	900 00	
							4,783 76
85	964	44	684	573	Excavation, 32,776 cubic yards, at 17 cents -	5,571 92	
					Three culverts - - - - -	900 00	
					One bridge - - - - -	300 00	
							6,771 92
86	660	44	1344	End	Embankment, 68,788 cubic yards, at 26 cents -	17,884 88	
					Puddling, 10,081 yards, at 12 cents - -	1,209 72	
					Paving, 1,186 yards at 18 cents - - -	960 66	
					Aqueduct - - - - -	4,066 00	
					Excavation, 9,180 yards, at 17 cents - -	1,560 60	
					Paving, 340 yards, at 81 cents - - -	275 40	
					Locks Nos. 37 and 38, 17 feet - - -	27,540 00	
							53,497 26
							$2,801,071 81
					Fencing 42 miles of canal, both sides, at $900 - - -		37,800 00
							2,838,871 81
					Superintendence, contingencies, &c. 5 per cent. - - -		141,943 59
					Amount of estimates - - - -		$2,980,815 40

It is necessary to observe, in relation to the above estimate, that it has been made on the supposition of all the works being executed in the most durable and workmanlike manner, and of the best materials which the neighboring country will afford for the purpose. The estimate has also been intentionally made high, so as to ensure that the work may be made for a sum within its limits, more or less, according as the contingencies may prove favorable or unfavorable.

On the examination of the country towards Annapolis.

Your orders of the 25th of October, 1826, directed me to make an examination of the country lying between the district we were operating in, and the city of Annapolis, with a view of connecting that city with the proposed canal. A slight examination convinced me of the impracticability of forming such a connexion between any valley leading into the Patapsco, and a valley leading into the Severn, without going so far to the east as would carry me much beyond the limits contemplated in my instructions. My attention was then directed to the possibility of making a communication between the valley of the Patuxent and that of the Severn. With this view, I carefully examined the ridge dividing the tributaries of these two rivers, extending from about four miles to the southeast of Waterloo, to the neighborhood of Annapolis. Throughout the whole extent of this ridge, I only observed one place that appeared favorable to the object. Between six and seven miles from Waterloo there is a wet swamp on either side of the road, from which the ground declines both to the right and left, having a branch of the Severn about three-quarters of a mile on the northeast, and the North Branch of the Patuxent about two miles in a direct line to the southwest, but between four and five miles to the southward, in following the valley of Rogues' Harbor Branch, which heads in this swamp.

From a careful view of the ground, this depression of the ridge appears to be lower than that previously described. through which the canal, as we located it, would pass to reach the Patapsco ; and seems to offer considerable facilities for forming a branch of canal on the same level as the summit of the principal line, and leaving this line near the mouth of Chandler's run, to continue along the valley of the North Branch, until a favorable situation occured for passing over to the valley of Rogues' Harbor Branch ; then, continuing up this last valley, always on the same level, until it should begin to descend to the Severn. The greatest obstacle to this plan, appears to be offered by the high isthmus, which lies between the North Branch and Rogues' Harbor Branch, which would, perhaps, require the line of canal to be carried near to the confluence of these streams, in order to preserve the proper level, and to avoid the alternative of encountering very deep-cutting. The valley of the Severn, once attained, there is no doubt of the practicabilty of continuing the canal along its bank as far as the harbor of Round Bay. This superb haven, having already had the attention of Government directed to it, as a suitable

situation for a Naval depôt, renders the termination in it of a canal communicating with Washington and Baltimore, an important and interesting consideration.

From the depression of the ground, of which I have been speaking, until near Annapolis, the ridge appears to be composed principally of a succession of high hills, much broken by deep ravines and valleys, but none of these extending so nearly from river to river as to offer sufficient encouragement for a further examination.

The possibility of forming a connexion between the Severn river and Eastern Branch, through the medium of South river, naturally presented itself for consideration, and, in consequence, I was led to make the necessary observations, to satisfy me on this head, and to make an examination of the ground lying between South river and the Pautuxent. On approaching the head of South river, from the direction of Annapolis, the general face of the country gradually rises, and becomes intersected by deep and narrow ravines. Some of these ravines approach pretty near to corresponding ravines, discharging into Severn, but none sufficiently so as not to require an excessive deep-cutting to connect them by a canal at a low level, (which the deficiency of the streams in the neighborhood would make necessary;) while the soil is extremely unfavorable to a work of this kind—being so light as to be easily washed into deep gulleys; which, indeed, is the mode of formation of the ravines in question.

The ground between South river and the Pautuxent, partakes of the character above described, but not in so great a degree. There appears to be a continuous depression, extending from South river over to Patuxent; but a careful view of it convinced me that is not sufficiently low to be commanded by any of the streams in the neighborhood.

In fine, the result of this examination is the conviction that the only route that offers a reasonable probability of forming a water communication between the Severn and Eastern Branch, either directly or through the medium of another canal, is that particularly abovementioned, as passing by the depression of the ridge which intervenes between the head of Rogues' Harbor Branch, and a branch of the Severn.

In concluding this report, I render an act justice in expressing my acknowledgments to my assistants, for the zeal, intelligence, and industry, with which they have afforded me their aid. Mr. J. F. Swift and Mr. F. Harrison, jr. at the head of their respective parties, assisted by Mr. Miller and Mr. Wall, as surveyors, gave every satisfaction. The two first named gentlemen, have also platted the work, and drawn the profiles of the same. Mr. Harrison has also made the drawings of the maps, which confer great credit upon him, not only for the neatness of their execution, but also for the fidelity of their topography.

All which is respectfully submitted.

WM. HOWARD,
Assistant Civil Engineer.

GEORGETOWN, D. C. *June 25th*, 1827.